

USER'S MANUAL 990-127
Revision D August 2005

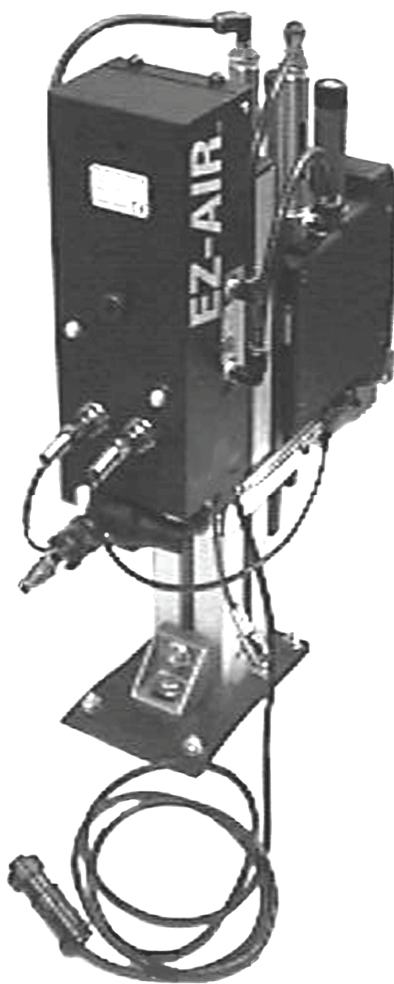


OPERATION AND MAINTENANCE MANUAL

FOR THE

DUAL EZ-AIR™ KIT

Model EZ/DAK



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Revision Record

Revision	EO	Date	Basis of Revision
A	17926	10/99	Original publication.
B	17936	11/99	Production release.
C	19146	1/02	Change name of equipment to Miyachi Unitek.
D	20505	8/05	Addition of EZ/AIR-DC, corporate name change to Miyachi Unitek.

Contents

Chapter 1: Description

Section I: Features	1-1
Features	1-1
Section II: Kit Components	1-2
Reference Publications	1-2
Major Components	1-2
Section III: Sequence of Operation	1-5

Chapter 2: Getting Started

Section I: Planning for Installation	2-1
Space Requirements	2-1
Power Requirements	2-1
Compressed Air Requirements	2-1
Section II: EZ-Air Set-up	2-2
Unpacking	2-2
Installation	2-2
Removing Existing System from Weld Head	2-2
Installing the EZ-Air	2-3
Section III: Pneumatic and Power Connections	2-3
Pneumatic	2-3
Power	2-4

Chapter 3: Operating Instructions

Section I: Operating Precautions	3-1
General Operator Safety	3-1
Section II: Preparing for Operation	3-1
Pre-Operational Checks	3-1
Turning the Equipment ON	3-1
Section III: Operation	3-1
Set-Up	3-1

Chapter 4: User Maintenance

Section I: Precautions	4-1
General Operator Safety	4-1
Section II: Operator Maintenance	4-1
Preventive Maintenance	4-1
Corrective Maintenance	4-1
Clearing Clogged Four-Way Valve	4-3
Repair	4-3
Appendix A: Specifications	A-1

Contact Us

Thank you for purchasing a Miyachi Unitek Dual EZ-Air™ Kit.

Upon receipt of your equipment, please thoroughly inspect it for shipping damage prior to its installation. Should there be any damage, please immediately contact the shipping company to file a claim, and notify Unitek Miyachi Corporation at:

1820 South Myrtle Avenue
P.O. Box 5033
Monrovia, CA 91017-7133
Telephone: (626) 303-5676
FAX: (626) 358-8048
e-mail: info@unitekmiyachi.com

The purpose of this manual is to supply operating and maintenance personnel with the information needed to properly and safely operate and maintain the Miyachi Unitek Dual EZ-Air Kit.

This kit can be added to an existing weld head (typically a Model 88A or 89A), and will replace a standard air kit. The installation instructions give procedures for retrofitting a weld head that has a standard air kit installed.

We have made every effort to ensure that the information in this manual is accurate and adequate.

Should questions arise, or if you have suggestions for improvement of this manual, please contact us at the above location/numbers.

Unitek Miyachi Corporation is not responsible for any loss due to improper use of this product.

Safety Notes

This instruction manual describes how to operate, maintain and service the Dual EZ-Air Kit, and provides instructions relating to its SAFE use. Separate manuals provide similar information for the Power Supply and the Weld head. Procedures described in these manuals **MUST** be performed, as detailed, by **QUALIFIED** and **TRAINED** personnel.

For **SAFETY**, and to effectively take advantage of the full capabilities of the workstation, please read these instruction manuals before attempting to use the workstation.

Procedures other than those described in these manuals or not performed as prescribed in them, may expose personnel to electrical, burn, or crushing hazards.

After reading these manuals, retain them for future reference when any questions arise regarding the proper and **SAFE** operation of the workstation.

Please note the following conventions used in this manual:

WARNING: Comments marked this way warn the reader of actions which, if not followed, might result in immediate death or serious injury.

CAUTION: Comments marked this way warn the reader of actions which, if not followed, might result in either damage to the equipment, or injury to the individual if subject to long-term exposure to the indicated hazard.

CHAPTER 1

Description

Section I: Features

Features

The Dual EZ-Air Kit, herein called EZ-Air, is an accessory for weld heads that pneumatically controls the actuation of the electrodes and maintains the preset firing force. At a predetermined firing force the EZ-Air closes the inlet and outlet valves to the weld head actuation cylinder and eliminates over-force. EZ-Air operates from power supply-generated power and has the following features:

- Is compactly packaged and can be retrofitted to Miyachi Unitek Model 88A or 89A weld heads without removal of the weld head covers
- Powered from the power supply (no separate control box required):
 - EZ-AIR: 24 VAC
 - EZ-AIR-DC: 24 VDC
- Contains EZ-CLEAN Valve which eliminates the need to re-adjust force after cleaning and dressing electrodes
- Contains operator-visible firing indicator lights
- Permits easy set-up of multiple weld heads to fire at the same force
- Contains a built-in down speed limiter to eliminate weld over-force and limit excessive impact force
- One knob force setting (per electrode), which requires no resetting, simplifies set-up and setting maintenance, with the following effects:
 - Process stability reduces process maintenance and training for users
 - Delivers accurate and repeatable force set-up with reduced process variation
 - Produces higher yields with reduced scrap from process variation due to incorrect force set-up

Section II: Kit Components

Reference Publications

Related manuals, which you will need, include the manuals that are provided with your weld head and your power supply. If you need additional copies of any of these manuals, they can be procured from Miyachi Unitek.

Major Components

Figure 1-1 shows the major components of the unit. Normally, these will be the only components associated with installation and operation. The function of each item is described below.

Firing Indicators. A green indicator, one for each side of the weld head, which lights when the firing switch closes and stays lit until the end of the weld cycle. Thus, if a malfunction occurs, the operator can determine whether a firing signal is present.

Initialization Signal Received Indicator. An amber indicator, visible through the hole in the EZ-Air cover, that lights when the initialization signal is received from the power supply, and stays lit until the pre-set force is reached. If a problem occurs, the operator can determine whether the problem is internal to the EZ-Air.

Air Cylinder Down Supply. Male elbow fitting, ¼ inch OD tube to ½ inch male NPT brass. Connects controlled compressed air to weld head air cylinder top port.

Mounting Bolt. A single Allen-head knurled socket screw, attached to a single T-nut that slides into the vertical strut channel, provides easy mounting of the EZ-Air. Below the T-nut on the EZ-Air casing is a location tab which properly positions the assembly into place on the weld head.

Air Cylinder Up Supply. Male elbow fitting, ¼ inch OD tube to ½ inch male NPT brass. Connects controlled compressed air to weld head air cylinder bottom port.

Down Speed Control Valve Adjustments. Operator adjustments, one for each side of the weld head, that allows setting of the downspeed of the electrodes to reduce part impact pressure.

Weld Head Firing Switch Connectors. Female cable jacks, Amphenol Type 80-MC2F. Mate with connectors (Amphenol Type MC23M80-MC2M) from each side of the weld head.

EZ-Clean Valve. Allows bleeding of input air supply to permit dressing of electrodes.

Shop Air Supply Input Fitting. ½ inch F'NPT fitting for connecting shop compressed air to EZ-Air. Shop air supply must be 85–140 psi . (586–965 kPa).

Fixed Air Regulator. Controls pressure of air from shop air source into EZ-Air. Regulator is factory set for 78 psi (538 kPa) and does not require any user adjustment.

EZ-AIR

Signal Cable and Connector. Two-conductor male plug to connect firing signal to the power supply.

24 Volt Power Source Cable and Connector. Conducts 24 volt solenoid drive power from the power supply to the EZ-Air.

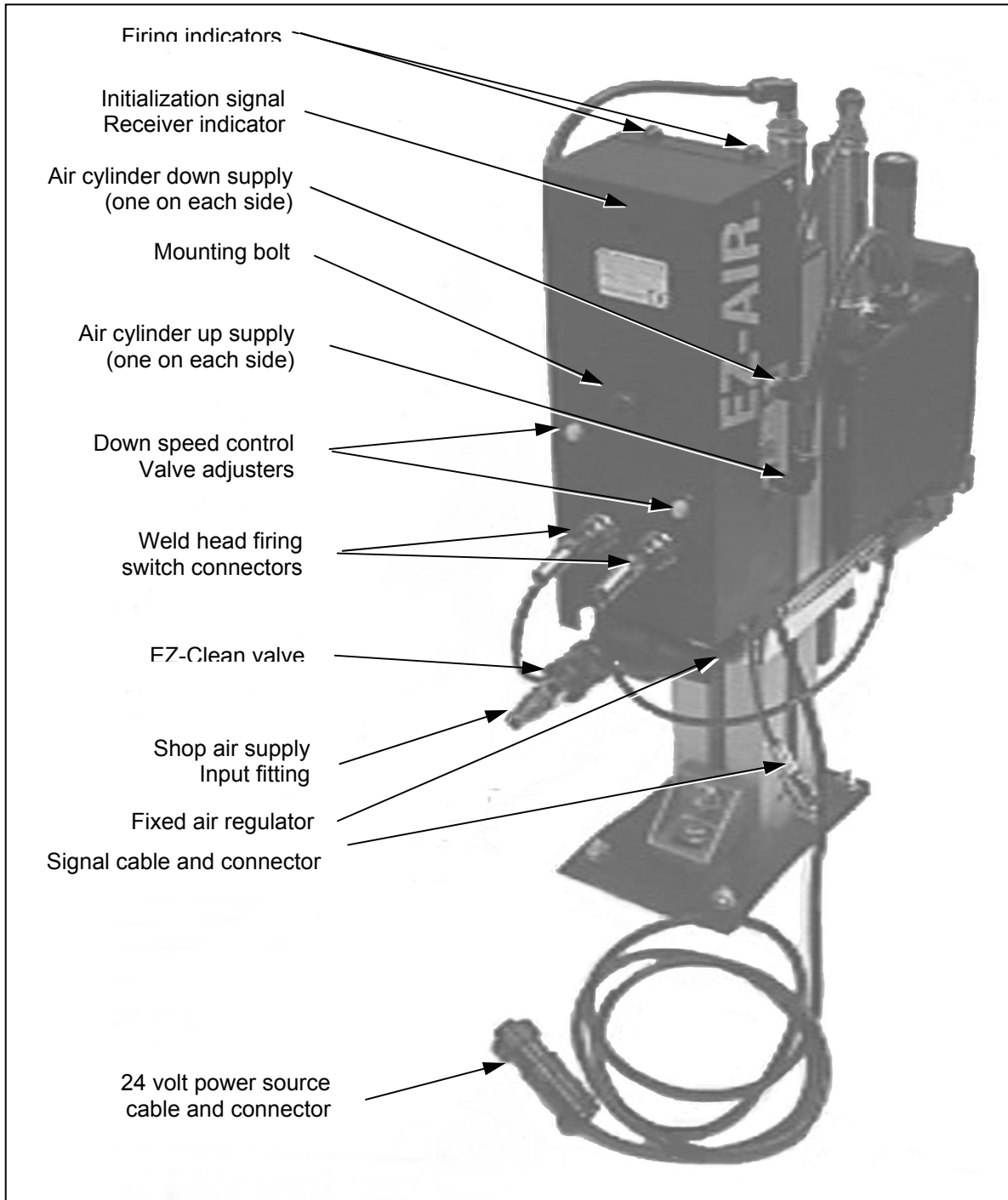


Figure 1-1. Dual *EZ-AIR* Components

EZ-AIR-DC

EZ-AIR-DC: 8-pin connector. Connects to back of the welder. Includes signals for 24VDC valve driver, firing switch and voltage sense

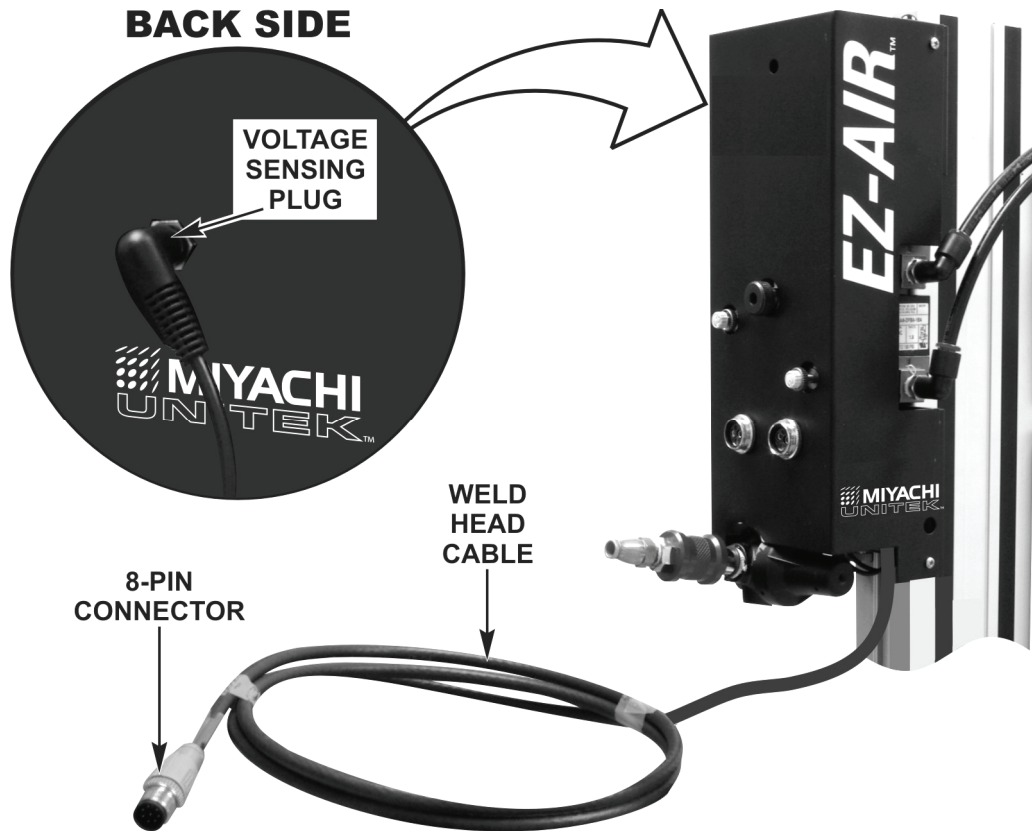
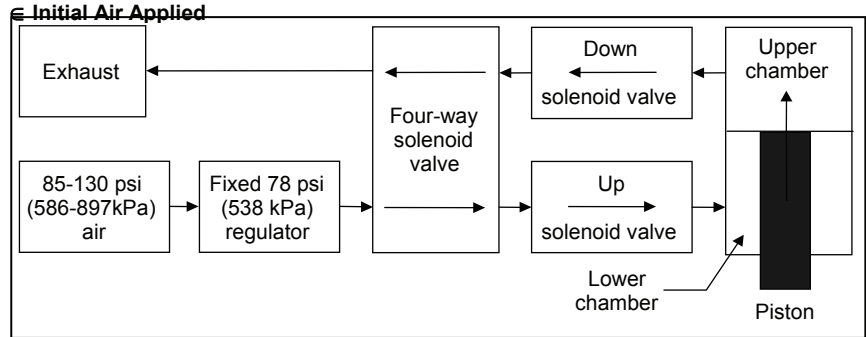


Figure 1-2. Dual *EZ-AIR-DC* Cables and Connectors

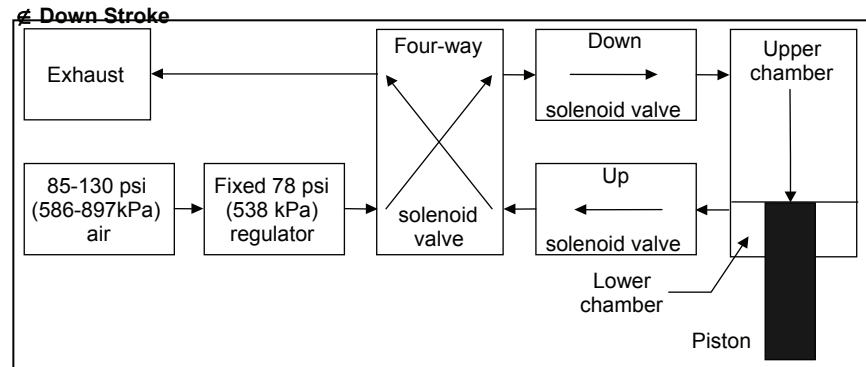
Section III: Sequence of Operation

EZ-Air uses a single four-way solenoid valve to direct air between the down solenoid valve and the up solenoid valve (figure 1-2). The following steps describe the sequence of operation of the EZ-Air kit.

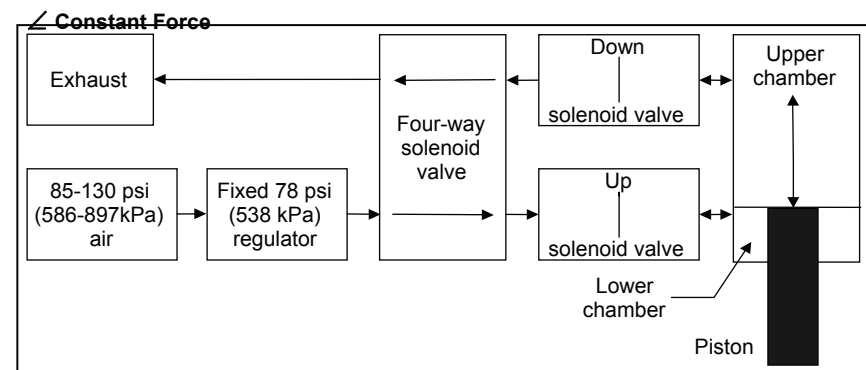
① Initial Air Applied. Upon initial application of air (whether or not power is applied), air pressure is applied through the four-way solenoid valve and the up solenoid valve to the lower chamber of the cylinder, driving the piston up. Air is exhausted through the four-way solenoid valve.



② Down Stroke. During the electrode down stroke, air pressure is directed to the upper chamber of the cylinder, forcing the piston down. Waste air exhausts from the lower chamber through the down solenoid valve and the four-way solenoid valve.



∠ Constant Force. When the electrode reaches weld force, the up and down solenoid valves close and air is trapped in both the upper and lower chambers of the cylinder. Weld force remains constant as the air cylinder piston cannot move. The four-way solenoid valve also switches to its off position, reversing the air connections to the up and down solenoid valves.



④ Up Stroke. At the completion of the weld, the up and down solenoid valves open. This causes the application of air pressure to the lower chamber of the cylinder, returning the piston to its up position.

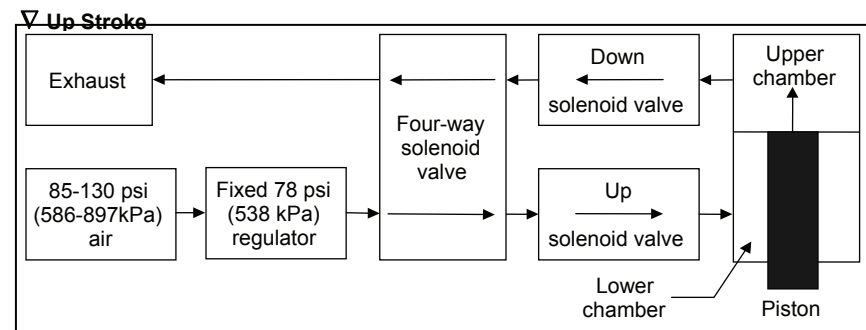


Figure 1-2. Sequence of Operation

CHAPTER 2

Getting Started

Section I: Planning for Installation

EZ-Air is about the same size as the standard air system and uses power from the weld head power supply. Therefore, there should be no space or power problems in installing the EZ-Air onto an existing weld head.

Space Requirements

An outline drawing of the EZ-Air is included in Appendix A. The specific dimensions are:

Width:	5.25 in. (133.35 mm)
Depth	5.50 in. (139.70 mm)
Height	11.49 in. (291.85 mm)
Weight	3.4 lb. (1.5 kg)

Power Requirements

Power is derived directly from the power supply; no special considerations are required. The EZ-Air requires the following power:

EZ-AIR:	24 VAC ∇ 10% power, 3/4 A
EZ-AIR-DC:	24VDC, 3/4 A

Compressed Air Requirements

The EZ-Air has a $\frac{1}{8}$ inch F’NPT fitting for connection to a shop air source of 85–140 psi (586–965 kPa). It is recommended that a auto drain air filter with a 5-micron element (part number 10-373-01, catalog number ADAF) be placed in the air line.

CAUTION: A shop air compressor using synthetic oil will cause damage to the EZ-Air, Petroleum-based oil only is recommended.

Section II: EZ-Air Set-up

Unpacking

Unpack the EZ-Air from its shipping box and verify that all parts are present. Table 1-2 lists the components of the ship kit, part number 4-81109-01, which contains parts needed to install the EZ-Air.

NOTE: Carefully place the packing materials back in the packing boxes and store for future shipping.

Table 2-1. Ship Kit List

Item	Use	Part No.	Qty
Plastic tubing	Make pneumatic connections	050-138	12 ft
Fitting	Adapter for shop-air input	325-185	1
Elbow fitting	Replace existing fitting on weld head	325-200	4
Allen wrench	Install EZ-Air	770-027	1
User's Manual	Installation/Operation instructions	990-127	1

Installation

Installation consists of physically mounting the EZ-Air on the weld head, connecting the power and signal cables, and connecting the pneumatic tubing. If the EZ-Air is a retrofit, the original air system must first be removed and the new kit installed.

Removing Existing Air System from Weld head

- 1 Turn off shop air and remove connection to existing kit.
- 2 Remove the existing tubes to the top and bottom of each cylinder.
- 3 Note which way each of the four valve assemblies are facing. Remove the two existing valve assemblies from the top and bottom of each of the two air cylinders. Clean any pipe joint sealant from the cylinders (figure 2-1).
- 4 Disconnect the weld head firing switch cables from air kit connectors and the air kit cables from the power supply.
- 5 Remove the existing air kit from the vertical support.

NOTE: If weld head cylinder has exceeded 10 million cycles, we recommend replacing it at this time. See your weld head manual for instructions.

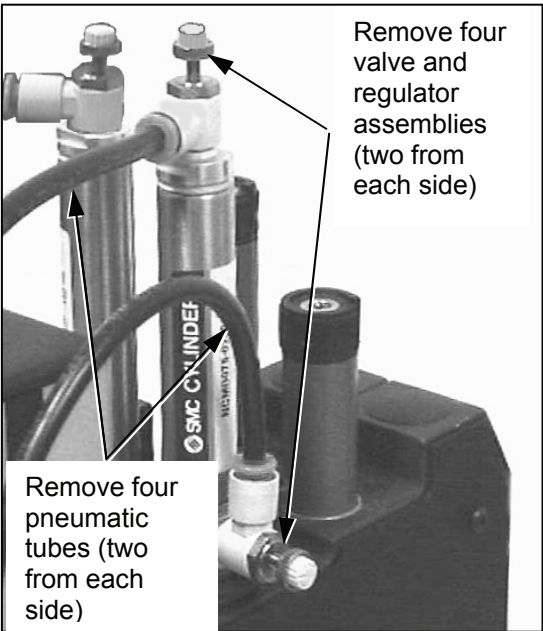


Figure 2-1. Removing Existing Air System Pneumatics

Installing the EZ-Air

- 1 From the packing box, remove the EZ-Air.
- 2 From the weld head vertical support, remove the plastic end cap.
- 3 Loosen the mounting bolt (figure 1-1) on the EZ-Air with the 5mm hex wrench included in the shipping kit so that the T-nut will slide into the vertical support slot (Figure 2-2). Adjust the EZ-Air so that its top is approximately at the same height as the air cylinder and, making sure that the guide on the lower end of the EZ-Air is in the vertical support slot, tighten the mounting screw.

CAUTION: Be sure no part of the EZ-Air touches the copper power bars; any contact will cause shorting of the weld current.

- 4 Re-install the vertical support end cap.

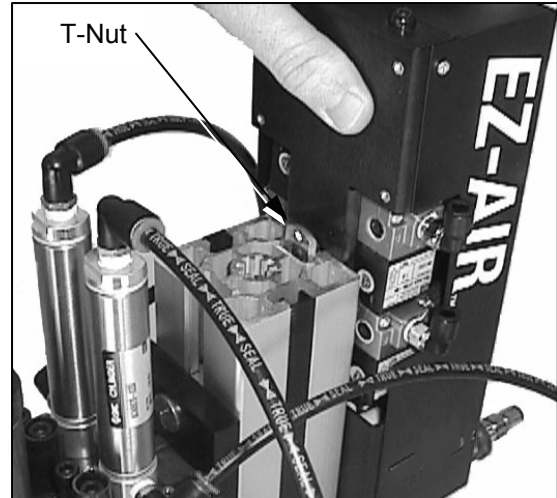


Figure 2-2. Installing EZ-Air

Section III: Pneumatic and Power Connections

Pneumatic

- 1 From the packing kit locate four new elbow joints (without valves) and install the joints into the two valve ports of each cylinder. The elbow fittings should face in the general direction that the earlier valve assemblies faced. That is, the two lower ones face upwards, and the two upper ones face slightly outward of the rear of the weld head.

NOTE: The cuts to be made in step 2 must be smooth and square. We recommend using an SMC TKA-1 tube cutter. Do not use pliers, wire nippers or scissors.

- 2 From the packing kit, locate the pneumatic tubing for connections between the EZ-Air and the up and down ports of each cylinder. Cut four pieces of tubing 9 inches long. The remaining tubing can be used for the shop-air connection (step 4).
- 3 Using the included push-in fittings, connect the pneumatic tubing. **NOTE:** Be sure the tubing is pushed in all of the way to prevent leakage, leading to imperfect welds. As shown in figure 2-3, the connections are intuitive. That is, the upper valve goes to the cylinder's upper port; the lower valve to the lower port. On each side of the EZ-Air are two fittings; the fittings on each side go to the respective cylinder of that side, with the top fitting of the EZ-Air going to the top fitting of the cylinder, and the bottom fitting of the EZ-Air going to the bottom fitting of the cylinder.
- 4 Connect the shop air to the EZ-Air shop air supply input fitting.

Power

- 1 Connect the weld head firing switch cables to the firing switch connectors on the EZ-Air, left side to left connector, right side to right connector.

- 2 24VAC EZ-AIR:

A Connect the valve driver cable connector to the 24 volt connector on the rear of the power supply.

B Connect the signal cable connector to the firing switch connector on the power supply.

24VDC EZ-AIR-DC

A Connect weld head driver cable to connector labeled WELD HEAD on control

B Connect voltage sense cable between EZ-AIR-DC and electrodes, if desired

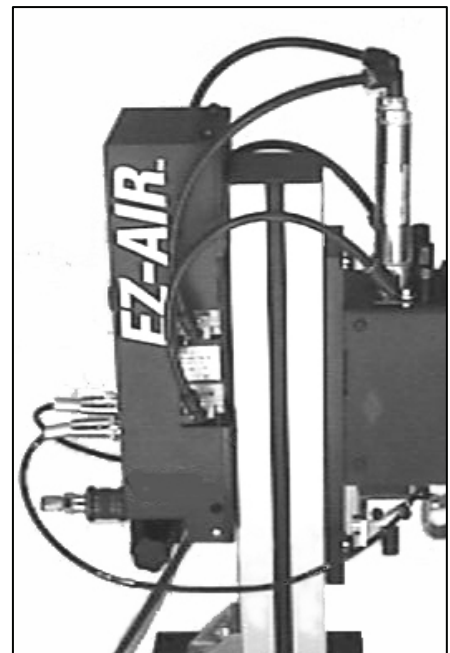


Figure 2-3. Installation of New Elbow Fittings and Pneumatic Tubes

CHAPTER 3

Operating Instructions

Section I: Operating Precautions

General Operator Safety

WARNINGS

Always wear safety goggles any time you are operating a weld head.

Never wear loose clothing or jewelry when operating the weld head. It could be caught in the mechanism.

Before operating a weld head, read the manuals on the power supply and the weld head. Particularly note the specific hazards associated with those components.

Section II: Preparing for Operation

Pre-Operational Checks

Before operating the equipment, verify that the power and compressed air connections are made to the EZ-Air as described in Chapter 2, Section III. Verify that all pneumatic connections are secure and that there are no air leaks.

Verify that the (red) EZ-Clean valve (figure 1-1) is slid fully toward the EZ-Air (non-purge position).

Verify that the weld head and power supply are properly connected.

Turning the Equipment On

To apply power to the unit, follow the directions in the respective power supply User's Manual.

Section III: Operation

Set-Up

CAUTION: Adjustment of the EZ-Air should only be done by an experienced and trained individual.

1. Refer to the appropriate weld head user's manual for spring force set-up. Disregard air adjustments.
2. Set the down speed control valve adjusters to provide an acceptable welding speed.

NOTE: Once set-up is completed, there are no separate steps required during weld head operation except that the EZ-Clean valve can be actuated to purge the air during electrode dressing. To do so, push the EZ-Clean (red) slide valve *away* from the EZ-Air. To restore pressure, slide the valve *toward* the EZ-Air.

CHAPTER 4

User Maintenance

Section I: Precautions

General Operator Safety

WARNINGS

Always wear safety goggles any time you are operating a weld head.

Never wear loose clothing or jewelry when operating the weld head. It could be caught in the mechanism.

Before operating a weld head, read the manuals on the power supply and the weld head. Particularly note the specific hazards associated with those components.

Section II: Operator Maintenance

Preventive Maintenance

The only preventive maintenance required for the EZ-Air is occasional lubrication of the EZ-Clean valve, whenever necessary. The valve should only be lubricated with a petroleum or lithium based grease.

CAUTION: Do not use synthetic oil. It will damage the EZ-Air.

Corrective Maintenance

The only recommended user corrective maintenance is clearing foreign matter that might jam a valve open. If the weld head fails to move up or down, refer to table 4-1 and perform the actions prescribed.

CHAPTER 4: USER MAINTENANCE

Table 4-1. Troubleshooting Table

NOTE: Table presumes all power and pneumatic connections are made and properly adjusted.

Fault	Check for:	Possible Cause	Action
Neither weld head moves upward when air is first applied.		Problem with input shop air	Verify correct input shop air pressure. See Chapter 2, Compressed Air Requirements.
		EZ-Clean valve is closed (away from EZ-Air).	Open valve by pushing valve toward EZ-Air.
		Four-way valve is stuck.	Clear four-way valve.
Only one side of the weld head moves upward when air is first applied.		Speed Control valve (of side that doesn't move) is stuck.	Contact company representative.
Neither side of the weld head goes downward when footswitch is pressed (first position for two-level foot switches).	Neither green firing indicators nor amber initialization signal received indicator light.	Problem exists in power supply, footswitch, or cable connections.	Check cable connections. Refer to appropriate power supply manual.
	Amber initialization signal received indicator is lit.	Four-way valve is stuck.	Clear four-way valve.
		Down Speed Control valve(s) are closed.	Turn valve(s) counterclockwise to open.
One side of the weld head does not go downward when footswitch is pressed (first position for two-step foot switches).	Green firing indicator on side of weld head that does not go downward is not lit.	Problem exists in power supply, footswitch, or cable connections.	Check cable connections. Refer to appropriate power supply manual.
		Down Speed Control valve(s) are closed.	Turn valve(s) counterclockwise to open.
	Green firing indicator on side of weld head that does not go downward lights.	Speed Control valve (of side that doesn't move) is stuck.	Contact company representative.

CHAPTER 4: USER MAINTENANCE

Fault	Check for:	Possible Cause	Action
One or both sides of weld head move downward too forcefully when footswitch is pressed (first position for two-step foot switches).		Down Speed Limiter valve requires adjustment.	Contact company representative.

Clearing Clogged Four-Way Valve

Occasionally, a speck of foreign matter may get into the EZ-Air and cause the four-way valve to stick. If this happens, you may be able to clear the valve by pressing the valve override. The four-way valve override is accessible without removing the EZ-Air cover (figure 4-1).

Repair

If problems cannot be resolved using the above troubleshooting table, contact Unitek Miyachi at the address/telephone/fax shown in the Foreword.

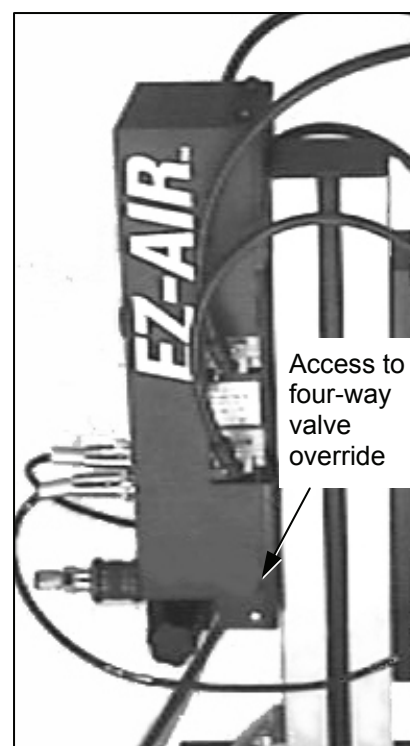


Figure 4-1. Location of Four-Way Valve Override

APPENDIX A

Specifications

Item	Specification
Dimensions	Width: 5.25 in. (133.35 mm) Depth: 5.50 in. (139.70 mm) Height: 11.49 in. (291.85 mm)
Weight	3.4 lb. (1.5 kg)
Power Requirements	EZ-AIR: 24 VAC $\pm 10\%$, $\frac{3}{4}$ A (Derived from power supply) EZ-AIR-DC: 24 VDC $\pm 10\%$, $\frac{3}{4}$ A (Derived from power supply)
Compressed air Requirements	85–140 psi . (586–965 kPa) An auto drain air filter with a 5-micron element (part number 10-373-01, catalog number ADAF) is recommended CAUTION: Compressor supplying air must not be lubricated with synthetic oil.
Operating Environment	60–113°F (15.5–45°C) 93% Relative Humidity (maximum) at 104°F (40°C)

APPENDIX A: SPECIFICATIONS

Outline Drawing

(Dimensions are in inches)

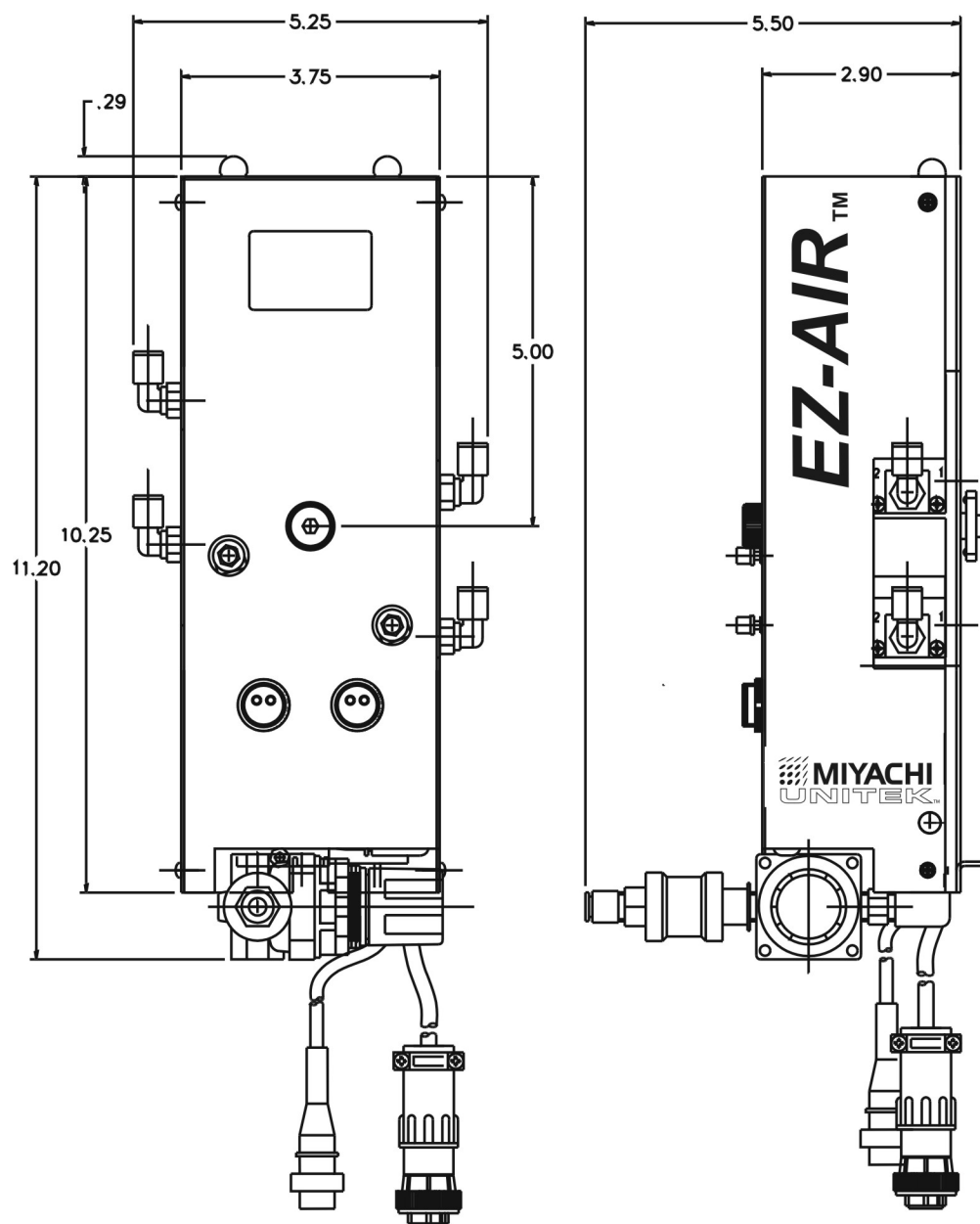


Figure A-1. Outline Drawing